



# Personality, risk cognitions and motivation related to demand of risk mitigation in transport among Norwegians



Trond Nordfjærn <sup>a,\*</sup>, Torbjørn Rundmo <sup>b</sup>

<sup>a</sup> Norwegian Institute for Alcohol and Drug Research, Department of Narcotics, Oslo, Norway

<sup>b</sup> Norwegian University of Science and Technology, Department of Psychology, Trondheim, Norway

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## ABSTRACT

There is insufficient knowledge regarding the role of personality traits, transport-related risk cognitions and safety motivation for demand for transport risk mitigation. The aim of this study is to test a model aimed to predict public demand for transport risk mitigation by these psychological risk constructs. A mailed self-completion questionnaire survey was conducted in a random sample of the Norwegian population aged 18–65 years obtained from the Norwegian population registry ( $n = 1947$ ). Results from structural equation modelling supported the hypothesis that sensation seeking, normlessness, risk cognitions and transport-related worry had mediated associations with demand for transport risk mitigation through safety motivation. There were no differences in the strength of associations related to gender and age. The findings are discussed in relation to personality-entailed measures as well as the link between cognitive and emotional approaches to transport risk.

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## 1. Introduction

One of the major challenges in current transport systems is to reduce the use of private motorized travel modes (e.g. car) and facilitate use of more environmentally sound public transport (e.g. metro, tram and train). Several contextual factors may influence use of transport modes, such as the availability of private motorized modes and public transportation modes, economic costs, and travel time (Beirão and Cabral, 2007; Limtanakool et al., 2006). However, recent research has shown that psychological considerations of safety and security factors in private motorized and public transport also predict mode use (e.g. Backer-Grøndahl et al., 2009; Rundmo et al., 2011). People who tend to use motorized private transportation modes more frequently than public transportation modes tend to be more worried about unpleasant incidents (e.g. criminality) in public transport compared to people who use public transportation modes more often (Backer-Grøndahl et al., 2009; Roche-Cerasi et al., 2013). Rundmo et al. (2011) also showed that individuals who focus on personal control and those who do not trust the ability of the transport authorities to mitigate the risk in public transport tend to use motorized private transportation modes. As such, it is relevant to

establish more knowledge about psychological factors related to the demands of risk-reducing transport measures exerted by the general public upon decision-makers, policy makers and safety experts (i.e. demand for transport risk mitigation). An improved understanding of factors underlying such demands may guide policy efforts to improve the safety by the authorities. The present study will provide insights into how personality factors, risk cognitions and safety motivation relate to demands for risk mitigation in transport in a population-based sample.

### 1.1. Literature review

Previous studies of demand for transport risk mitigation have mainly been preoccupied with cognitions and emotions, such as risk perception and worry regarding accidents (e.g. Moen and Rundmo, 2006; Moen, 2007). While these are important approaches, we are not familiar with studies that have investigated the role of risk taking propensity traits for safety motivation and demands of transport risk mitigation in the public. Moen (2007) found that sensation seeking traits were negatively associated with priorities of safety, but did not integrate safety motivation and demand for risk mitigation into the model.

A possibility is that risk taking propensity personality traits, such as sensation seeking (individuals' cravings for stimulation and to act out spontaneously) (Zuckerman, 1994) and normlessness (a tendency to violate norms in order to obtain individual

\* Corresponding author at: Norwegian Institute for Alcohol and Drug Research, Department of Narcotics, Box 565 Downtown, 0105 Oslo, Norway. Tel./fax: +47 22 34 04 00.

E-mail address: [tn@sirus.no](mailto:tn@sirus.no) (T. Nordfjærn).

social goals) (Kohn and Schooler, 1983) could reduce transport safety motivation (i.e. the commitment, efforts and drive people have in regard of transport safety). The assumption that risk taking personality traits could relate to a reduced drive for safety is in line with trait theory (Costa and McCrae, 1992) and research within the road traffic sector (Iversen and Rundmo, 2002; Ulleberg and Rundmo, 2003). These studies have shown that risk taking personality traits relate to unsafe attitudes towards traffic safety, lower traffic-related risk perception and unsafe driver behaviour. If personality factors are related to safety motivation it may be possible to predict which trait markers that are associated with a lower motivation for transport safety and reduced demands for mitigation efforts in transport. Given that people with risk propensity traits have lower motivation for safety, it may more efficient to focus on other countermeasures than safety in order to change transport mode use among these individuals.

Safety cognitions, such as risk perception (i.e. cognitive probability estimates of accidents \* the perceived potential severity of consequences if accidents occur) (Sjöberg, 2002), may also be relevant for the demand for transport risk mitigation. Although the majority of previous studies reported that the consequence-component of risk perception is a stronger predictor of risk mitigation demands than the probability-component (Sjöberg, 1999, 2000), these studies examined probability and severity of consequences at a rather broad level ranging from trivial low-consequence hazards (e.g. to catch a cold) to high impact risks (e.g. nuclear accidents). Studies that have examined the consequence-component of risk perception in relation to transport risks have called into question whether the consequence-component is more important than the probability component (Rundmo et al., 2011). Hence, an important contribution of the present study is that both the probability and consequence components of risk perception were included.

Previous studies reported that risk perception primarily is important for demand for risk mitigation because a high risk perception influences emotions and increases the concern that people experience in relation to accident risk (i.e. transport-related worry), which in turn may predict demand for transport risk mitigation (Moen, 2007). Previous longitudinal studies also found that

increased risk perception had a temporal relation to increased worry (Kobbeltved et al., 2005). Thus far, studies have not investigated the assumption that transport-related risk perception and worry may be mediated through increased safety motivation. A mediating role of safety motivation for safety cognitions and emotions on demands for transport risk mitigation is in line with drive-reduction approaches to motivation and the protection motivation theory (Rogers, 1975). When the individuals experience negative cognitions and emotions in relation to a stimulus, a motivation may be shaped to reduce the arousal and tension (Feldman, 2010). Although some previous studies found a direct link between risk cognitions, emotions and demands for risk mitigation, it is possible that these constructs are primarily important because they facilitate a tension-reducing drive that in turn increases motivation for demanding risk mitigating activities from the authorities.

Several previous studies within the domain of occupational safety have shown that employee motivation of safety is important for employee risk and accident-preventing behaviour (Cohen, 1977; Probst and Brubaker, 2001; Rundmo, 1996; Rundmo and Iversen, 2007; Smith et al., 1978). However, efforts to link safety motivation to policy demands within the transport domain remain scant. On the basis of studies conducted within occupational safety one may expect that a strong motivation for safety increases the demand for transport risk mitigation. Based on the cited theories and empirical work it can be hypothesized that personality factors as well as risk cognitions and emotions may influence the drive and 'push' for risk mitigation demands (i.e. an indirect mediating role of safety motivation on demand for risk mitigation).

## 1.2. Aims of the study

The present study aims to examine the role of personality traits (i.e. sensation seeking and normlessness), risk perception, worry and safety motivation for demands of transport risk mitigation in a Norwegian population sample. The working model of the study is shown in Fig. 1. We hypothesize that both the risk taking personality traits are negatively related to motivation for safety in transport and also negatively related to risk perception. Risk perception is hypothesized to be directly positively associated with safety

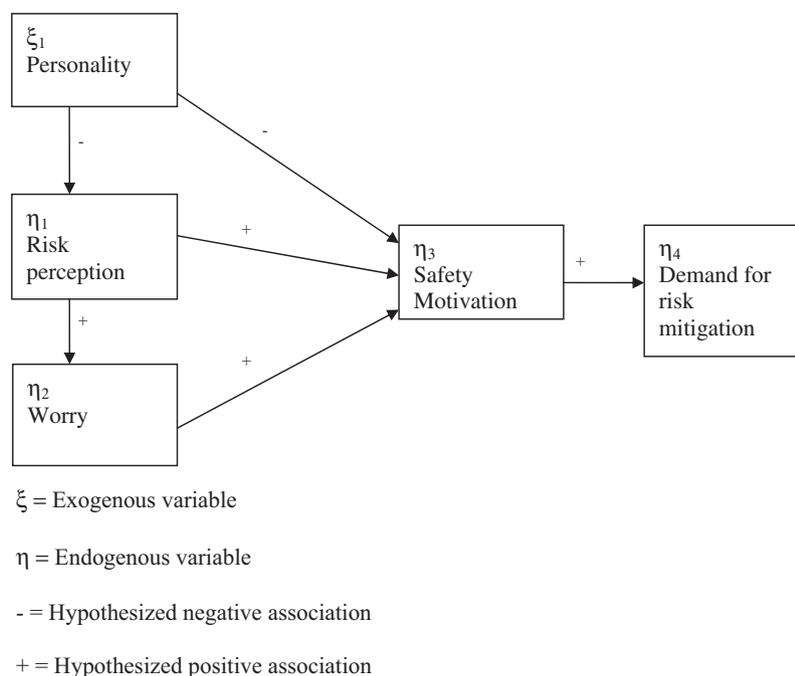


Fig. 1. Working model of the study.

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